



DEPARTMENT OF THE ARMY  
HEADQUARTERS, AREA II SUPPORT ACTIVITY  
UNIT #15333  
APO AP 96205-5333

REPLY TO  
ATTENTION OF:

IMKO-AB-SO

9 September 2005

COMMAND POLICY 10-8

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Area II Support Activity (SA) Confined Space Entry Program

1. REFERENCES:

- a. AR 385-10, 29 Feb 00, The Army Safety Program
- b. AR 11-34, 15 Feb 90, The Army Respiratory Protection Program
- c. AR 40-5, 15 Oct 90, Preventive Medicine
- d. EM 385-1-1, 3 Nov 2003, Safety and Health Requirements Manual,
- e. 29 CFR 1910.146, Occupational Safety and Health Administration Standard, Permit-Required Confined Spaces for General Industry
- f. 29 CFR, 1910.134, Occupational Safety and Health Administration Standard, Respiratory Protection.
- g. Command Policy Letter 10-2, Area II Respiratory Protection Program and SOP.
- h. ANSI Z117.1-1989, American National Standards Institute, Safety Requirements for Confined Spaces.

2. PURPOSE: Establishes guidelines and procedures for entry into confined spaces and provide information to all military, civilian, and contract employees who are required to enter and perform work in confined spaces within Area II This program addresses procedures:

- a. To assure that only trained, qualified, and certified personnel perform duties involving entry or rescue operations within permit-required confined spaces.
- b. To ensure personnel are properly equipped prior to entering a confined space.

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c. To ensure the mission is accomplished in a safe manner, while reducing hazards for risk.

d. To ensure a risk assessment is thoroughly performed and conveys the potential risk at each site.

3. APPLICABILITY: This applies to military, civilian, and contract employee who are required to enter and perform work in confined spaces within Area II.

4. DEFINITIONS: See Appendix A

5. RESPONSIBILITIES:

a. Area II SA , Installation Commander:

(1) Provide sufficient funds, qualified personnel, and resources and delegate sufficient authority to subordinate unit commanders, activities directors, supervisors and division chiefs to implement the program.

(2) Appoint, in writing/on order, a qualified Confined Space Program Manager (CSPM).

b. Confined Space Program Manager (CSPM):

(1) Will be responsible for the implementation of the Area II Confined Space Entry Program and monitor the effectiveness of the program.

(2) Shall successfully complete a Confined Space Safety course conducted by Department of the Army, Air Force, Naval Occupational Safety and Health and Environmental Training Center (NAVOSH ENVTRACEN), or equivalent.

(3) Will make an evaluation of the Confined Space Entry Program following any mishap or other incident, and at least annually to ensure the effectiveness of the program.

(4) Provide a central point of contact for the installation confined space entry program.

(5) Review and approve unit's written confined space entry program and SOP.

(6) Verify trainings and certification of unit personnel

c. Area II Support Activity, Installation Safety Manager (at 738-4643):



(1) Develop the Area II Confined Space Entry Program.

(2) Provide guidance and technical assistance to subordinate unit commanders, activities directors/supervisors, and division chiefs regarding implementation of and compliance with elements of the Confined Space Entry Program.

(3) Assist units/activities/organizations in development and implementation of permit-required confined space entry program where needed

d. Industrial Hygiene (IH) Office, Area II (at 736-7564):

(1) Assist units/activities/organizations in identification of permit-required confined spaces and the potential atmospheric hazards.

(2) Provide assistance to units/activities/organizations in the development and implementation of permit-required confined space entry program where needed.

(3) Assist units/activities/organizations with the selection, procurement, proper use of personnel protective equipment including appropriate respiratory equipment, and atmospheric test/monitoring equipment required for specific permit-required confined space hazards and operations.

(4) Assist entry (on-site) supervisors in the interpretation of monitoring results.

(5) Provide technical advice and consultation on preventive medicine/industrial hygiene topics related to permit-required confined space entry operations to entry supervisors.

(6) Evaluate confined spaces for hazardous atmospheres and Immediately Dangerous to Life and Health (IDLH) conditions as necessary to meet mission requirements.

e. Unit Commanders, Activity Directors/Supervisors, and Division Chiefs:

(1) Appoint, on orders, a qualified person as the Unit Confined Space Coordinator (CSC). A copy of the order will be provided to the CSPM and Area II SA Installation Safety Manager.

(2) Evaluate the workplaces to determine whether the workplace is non-permit required confined space or permit required confined space. Use Permit-Required Confined Space Decision Flow Chart (See Appendix B).

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(3) Develop listing and location of the confined space and provide the list to the CSPM, Area II SA Safety Manager, Fire Chief, and the 18<sup>th</sup> MEDCOM Industrial Hygiene Office.

(4) Ensure permit-required confined space warning signs, "DANGER, CONFINED SPACE, ENTER BY PERMIT ONLY" are installed at appropriate locations.

(5) Ensure all personnel assigned confined space duties are adequately trained and certified. All training records must be documented.

(6) Establish a unit written confined space entry program for each unit/organization/division conducting confined space entry operations. The written program will be submitted to the Area II SA, Installation Safety Manager for review and approval.

(7) Review all non-permit confined spaces within their area of responsibility at least annually to ascertain that no changes have occurred which would affect the original classification.

(8) Ensure all personnel assigned confined space duties become familiar with the unit's confined space entry program and review the program as part of their refresh training.

(9) Procure and provide all necessary equipment and ensure it is properly used and maintained. Equipment must be calibrated according to manufacturer's specifications, and personnel must be trained on how to operate the equipment. When confined space work is performed by a contractor, ensure that the contractor has all equipment stipulated by the contract.

(10) Provide additional worksite-specific training for personnel designated to work in confined space operations within his/her unit/activity, that is, entry (on-site) supervisor, entrants, attendants, and rescue procedures, etc., to ensure they acquire and demonstrate the knowledge and skills necessary for the safe performance of their duties.

(a) Equipment procured for explosive atmospheres must be intrinsically safe/explosion proof. Minimum equipment requirements to perform designated work in the permit-required confined space are:

- Atmosphere testing and monitoring equipment
- Ventilating equipment.



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- Communications equipment.
- Personnel protective equipment.
- Lighting equipment.
- Barriers and shields for the protection of pedestrians and vehicles.
- Entry and exit equipment.
- All other equipment required by the standard, that is, signs, retrieval systems (tripod, full body harness, etc.).

(11) Implement a permit-required confined space system and ensure entry permits are completed and issued for each job/operation.

e. Unit Confined Space Coordinator (CSC):

(1) The personnel designated in writing by the organization's commander, activity directors/supervisors, and division chiefs to manage the activities where confined space entry has been identified through comprehensive job analysis. A copy of the orders will be provided to the CSPM and Area II SA Installation Safety Office.

(2) Conduct hazard assessment for the confined space (See Appendix E, Confined Space Hazard Assessment) to identify the sequence of work to be performed and to identify the specific hazards in the confined space.

(3) Document the location of each confined space with the information provided by the unit commanders, activity directors/supervisors, and division chiefs.

(4) Know the hazards that may be faced during entry, including the mode, signs or symptoms, and consequences of exposure.

(5) Ensure that requirements for confined space entry have been completed before entry is authorized and confined space monitoring is performed by personnel qualified and trained in confined space entry procedures.

(6) Notify the Fire Department before beginning and when completing confined space operations.

(7) Determine the entry requirements and review and approve confined space entry permit form. Forward the permit form to CSPM, Safety Office, Fire Department and IH office.

(8) Notify all involved employees of the permit requirements and post the permit in a conspicuous location near the job.

(9) Ensure that the permit is canceled when the work is done and ensure the confined space is safely closed and all workers are cleared from the area.

(10) Ensure that Material Safety Data Sheets (MSDSs) for any hazardous chemicals used in the operation will be available at the confined space worksite.

f. Entry (on-site) supervisor:

(1) Is the person who is a qualified and oversee entry operations.

(2) Determine if conditions are acceptable for entry. Measure the oxygen, flammable, and toxic hazard atmospheric concentrations. Determine the frequency of monitoring. Consult with the 18<sup>th</sup> MEDCOM Industrial Hygiene Office, if necessary.

(3) Notify Safety Office, Fire Department, and Industrial Hygiene Office before entry into any known Immediately Dangerous to Life or Health (IDLH) Permit Required Confined Spaces.

(4) Determine the number of attendants required perform the work and ensure the attendant knows how to communicate with the entrants and how to obtain assistance.

(5) Ensure measures are in place to keep unauthorized personnel clear of the area.

(6) Ensure a rescue team is available and instructed in their rescue duties.

(7) Terminate entry procedure as required.

g. Confined Space Entrants:

(1) Personnel who are granted permission to enter a confined space.

(2) Each individual should have attended a confined space training course.

(3) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure. Stay alert to the hazards that could be encountered in a confined space.

(4) Read and observe the entry permit requirements.



(5) Be familiar with the use and handling of required equipment including personal protective equipment such as lifeline, respirator, or clothing needed for safe entry and exit.

(6) Immediately exit the confined space when ordered to do so by the attendant, an automatic alarms sound, they perceive they are in danger, or they notice physiological stress or changes in themselves or co-workers (e.g., dizziness, blurred vision, shortness of breath).

h. Confined Space Attendant will:

(1) Remain outside the permit space during entry operations until relieved by another attendant.

(2) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure.

(3) Maintain a sign-in/sign-out log with a count of all persons in the confined space and ensure all entrants sign in/sign-out.

(4) Monitor surrounding activities to ensure the safety of personnel.

(5) Maintain effective and continuous communication with personnel during confined space entry, work and exit.

(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

- If the attendant detects a prohibited condition;
- If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;
- If the attendant detects a situation outside the space that could endanger the authorized entrants.

(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards

i. Fire and, Emergency Service Division, DPW will:

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(1) Provide rescue support for confined space entries for all permit-required confined space accidents

(2) Ensure the fire prevention representatives on confined space rescue teams are trained in confined space requirements. Each individual should have attended a formal confined space course. If the person has not attended a formal confined space course, the Fire Chief will ensure the person has adequate experience in confined space operations.

(3) When requested, assist unit commander or director in obtaining training for entrants, entry supervisors.

(4) Comply with emergency and rescue services required by 29 CFR 1910.146, paragraph k to ensure each member of the confined space emergency rescue team is proficient recognizing with properly performing rescue procedures.

j. Contracting Officer (CO) will:

(1) Ensure that the requirements of the Area II SA Confined Space Program are integrated into all applicable contracts, and that contractors understand when either they or their sub-contractors perform work on the installation or facility, they must adhere to the established guidelines set forth in the program document.

(2) Be informed of this requirement as well as the on-site construction rules that apply during the pre-construction conference.

k. Contracting Officer's Representative (COR) will:

(1) Ensure all construction contracts, prior to start of construction, include specific sections which address confined spaces, and that contractors comply with the USACE manual 385-1-1 IAW FAR 52.236-14. It is the contractor's responsibility to provide confined space entry protection to all workers exposed to confined space hazards, and to ensure that they have been properly trained.

(2) Receive a written confined space entry plan by contractor as part of the contract, which includes training requirements for their workers as well as subcontractor workers, and review it prior to approval. Confined space entry will be one of the main topics discussed during the Pre-Construction Conference.

7. GENERAL REQUIREMENTS:

a. Identification of Confined Spaces:



(1) All workplaces must be evaluated to determine if any spaces are permit-required confined spaces.

(2) The confined spaces will be classified as permit-required confined spaces or non-permit required confined spaces based on the degree of hazard as defined by this program. (See Appendix B, Permit Required Confined Space Decision Flow Chart.)

(3) Example of confined spaces includes storage tanks, tank cars, tank trucks, process vessels, enclosed valve boxes, pits, vats, boilers, steam drums, sewers, sewage pump stations, tunnels, pipelines, furnaces, sealed or isolated compartments of ships, aircraft, and air supply and exhaust ducts, or holes, trenches or cavities that exhibit little or no air movement.

b. Initial Testing and Evaluation of Confined Space Conditions:

Entry (on-site) supervisor, in coordination with the Unit Confined Space Coordinator, should test for and evaluate many factors prior to classifying a confined or enclosed space. Such evaluations will include, but are not necessarily limited to, the following considerations:

(1) The contents or previous contents of the space that may result in the presence of flammables, toxic materials, or oxygen-deficient or enriched atmospheres.

(2) The location and configuration of the space, including restricted access, obstructions, remoteness, etc., which may inhibit or interfere with movement, ventilation, rescue efforts, or fire fighting efforts.

(3) Potential hazards from the external environment, such as the proximity of liquid oxygen (LOX) storage operations, petroleum, oil, and lubricants (POL) storage areas, sewer and waste water treatment processes, and underground disposal sites, which could affect the atmosphere within the confined space.

(4) The types of operations that are conducted within the space, particularly those which by the very nature of the process produce toxic materials, flammables, oxygen depletion or enrichment, or ignition sources.

(5) Fixtures, devices, or equipment within the space that may create or contribute to hazardous conditions including piping systems, conduits, ducts, machinery, pressurized lines, etc.



(6) The presence of other hazards such as slippery surfaces, deteriorated or unstable portable ladders, irritant or caustic materials, etc. Pay attention to the condition of permanently-installed ladders, such as those with metal rungs embedded into concrete walls of manholes or other structures.

(7) The boundary spaces and their contents to ensure fire or explosion are not caused in these spaces by the operation being conducted.

(8) Initial testing that shall be performed from outside the space. Testing into the interior of the space may be performed by drop tests or insertion of sample probes and hoses into the space. Testing should be performed in the following sequence:

- Test oxygen content. Combustible gases are tested after tests for oxygen content because the threat of fire or explosion is more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors. An oxygen deficient atmosphere has less than 19.5% available oxygen. Any atmosphere with less than 19.5% oxygen should not be entered without an approved self-contained breathing apparatus (SCBA). The oxygen level in a confined space can decrease because of work being done, such as welding, cutting, or brazing; or it can be decreased by certain chemical reactions (rusting) or through bacterial action (fermentation). Also, an oxygen-enriched atmosphere (above 21%) will cause flammable materials, such as clothing and hair, to burn violently when ignited. Therefore, never use pure oxygen to ventilate a confined space. Ventilate with normal air.

- Flammable Hazard: Many combustible gas indicators and (or) explosimeters require oxygen for proper operation (generally 10- to 30-percent oxygen by volume). Corrections for known flammable components, if different from the calibration gas, should be made according to the manufacturer's instructions. Flammable Atmospheres: Two things make an atmosphere flammable: 1) the oxygen in air; and 2) a flammable gas, vapor, or dust in the proper mixture. Different gasses have different flammable ranges. If a source of ignition (e.g., a sparking or electrical tool) is introduced into a space containing a flammable atmosphere, an explosion will result.

- Toxic Materials: Most substances (liquids, vapors, gases, mists, solid materials, and dusts) should be considered hazardous in a confined space.

c. Posting of Warning Sign:



(1) If the workplace is classified as a Permit-Required Confined Space, it must have permanent sign(s) in English and Hangul (Korean language) at each entrance into the space. Signs should read "DANGER -CONFINED SPACE- ENTER BY PERMIT ONLY, 위험 -밀폐공간임 - 허가를 받아야 출입할 수 있음". Sample of sign is shown at Appendix C.

(2) If the workplace is classified as a non-permit confined spaces, the entrance should be posted with the following sign, "DANGER - CONFINED SPACE, AUTHORIZED PERSONNEL ONLY", "위험 -밀폐공간임 -인가 받은자 만이 출입할 수 있음. Sample of sign is shown at Appendix C.

(3) Confined spaces will be secured with locks or barriers to prevent unauthorized entry.

d. Training:

(1) Training will be provided to personnel responsible for supervising, planning, entering, or anticipating in confined space entry and rescue.

(2) Topics to attain competency in:

- Identifying permit-required confined spaces.
- Recognizing and classifying the hazards of confined spaces.
- Preparing the work area (such as lock out/tag out and work area isolation procedures).
- Completing an entry permit.
- Implementing entry procedures.
- Use of powered ventilating equipment.
- Pre-Entry Atmospheric Checks and Post Ventilation Pre-Entry atmospheric check.
- Proper use of sampling equipment and sampling procedures.
- Periodic and/or continuous atmospheric monitoring procedure.
- Use of required personal protective clothing and equipment.

- Use of required personal protective clothing and equipment.
- Use of Respiratory protection equipment.
- Use of emergency rescue and safety equipment.
- Implementing emergency and rescue procedure.
- Medical screening requirements.
- Communications.
- Understanding of the written installation confined space program.

(3) Training will be conducted initially and retraining is required when:

- There is a job change.
- There is a change in the permit space program.
- When the worker's job performance shows deficiencies.

(4) Verification and documentation of all training:

- All training records will be documented and reviewed.
- Periodic assessment of the effectiveness of employee training should be conducted by a qualified person.

e. The Entry Permit:

(1) An entry permit is a formal authorization to perform work in permit-required confined space.

(2) An entry permit in a permit required confined space will be prepared and completed by a trained and qualified entry (on-site) supervisor and approved by the Unit CSC.

(3) "CONFINED SPACE ENTRY PERMIT FORM" is provided in Appendix D. Confined Space Entry Permit will address the following information:

(a) Specify the location of confined space and type of work to be accomplished.



- (b) Specify the duration of the operation (hour/date/month/year).
  - (c) Specify the confined space classification.
  - (d) Specify the names of the individuals working in the confined space.
  - (e) Certify that the work area has been prepared properly.
  - (f) Specify the results of atmospheric gas test.
  - (g) Certify that the testing equipment has been calibrated according to the manufacture's recommendations.
  - (h) Specify the type and amount of personal protective clothing and equipment required for the operation.
  - (i) Certify that special entry precautions have been taken.
  - (j) Certify that a rescue plan has been devised and rescue equipment is in place.
  - (k) Specify phone numbers of emergency contacts including medical contact, activity supervisor, the safety officer, and the fire and emergency service division.
  - (l) Certify that workers have undergone all training required.
  - (m) Indicate the entry supervisor's authorization with his signature and date/time of authorization.
- (4) The confined space entry permit shall be clearly posted at the point of entry into the confined space. When the assignment is completed or when new conditions exist, the entry supervisor must terminate entry and cancel permits.

f. Rescue Procedures:

- (1) Self Rescue: Self-rescue is achieved when authorized entrants leave the confined space on their own, which is the desired situation.

(2) Non-entry rescue: If self-rescue is not possible, non-entry rescue is the next preferred method, which is, retrieving an entrant using attached full body harness and mechanical tripod (retrieval system equipment). During non-entry rescue, the attendant will not enter the confined space. A retrieval system is required anytime an authorized entrant makes entry into a vertical permit-required confined space more than 6 feet deep, unless usage would create a greater hazard to the entrant. The retrieval system must be attached to a fixed point outside the confined space.

(3) Entry Rescue: Entry rescue involves rescuers entering the space to retrieve the entrant and/or provide the victim with emergency assistance such as CPR, first aid, and air via self contained breathing apparatus (SCBA) or a supplied air respirator (SAR), if needed. Rescuers should wear SCBA or SAR. Do not use air purifying respirators for confined space rescue. An entry rescue plan needs to be developed ahead of time in the event of an emergency for which the non-entry rescue plan is not appropriate.

(4) Emergency Rescue:

- Provision for emergency rescue must be planned and established before any entry into a permit-required confined space is authorized.

- Fire and Emergency Services Branch, DPW is the only authorized agency to enter the confined space and perform emergency rescue by properly trained and authorized personnel.

- Emergency and rescue services will be performed by procedures required by paragraph k of 29 CFR 1910.146.

g. Equipment: The following safety equipment will be required as minimum.

(1) Oxygen and gas detectors and other sampling devices as needed and determined by a qualified person to test for flammable, oxygen deficient and toxic atmosphere.

(2) Blowers and ventilation equipment designated for entering confined spaces.

(3) Personal protective equipment for the eyes, face, head, and clothing such as chemical resistant coveralls, and rubber boots.

(4) Respiratory protection as determined by the qualified person based upon the conditions and test results of the confined space and the work activity to be performed.

(5) A body harness and attaching life line.



(6) A tripod or other lifting device capable of retrieving entrants from a confined space. Unless the only hazard present is a potentially hazardous atmosphere and mechanical ventilation can be demonstrated to maintain acceptable entry levels for contaminants.

(7) Where there is potential for flammable atmospheres, all tools and electrical equipment shall be approved for hazardous locations.

(8) Communications equipment as needed.

(9) Properly rated lighting equipment to enable employees to work safely.

#### 8. NON-PERMIT CONFINED SPACE ENTRY REQUIREMENTS.

a. "Non-permit confined space" means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. And the space has been demonstrated to pose only an actual or potential hazardous atmosphere, and can be maintained safe with forced air ventilation alone.

b. Inspection: Confined space classified as non-permit spaces must be monitored and inspected initially and periodically re-evaluated by a competent person to determine if the classification is still applicable. If conditions change the space may be reclassified as a permit-required confined space.

c. Training: All personnel entering a non-permit required confined space must receive the same training as required for a permit required confined space.

d. Ventilation: Forced air ventilation shall be used. The air supply for the forced air ventilation shall be from a clean source and not increase the hazard in the space.

f. Approval: All personnel involved with non-permit confined space entry activities must have Unit CSC authorization to perform work activities within the space.

9. RECORD KEEPING REQUIREMENT: A copy of the following documents must be maintained by the indicated personnel.

a. Unit Confined Space Entry Program: Unit Commanders/Activities Director/Supervisors.

b. Identification and Classification List of Confined Spaces in Area II: CSPM

c. Employee's Training Document: Unit Commanders/Activities Director/Supervisors.

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d. Confined Space Entry Permit Form (See Appendix D): CSPM and Confined Space Entry (On Site) Supervisor.

e. Duty Appointment Letter of Unit CSC: Unit Commanders/Activities Director/Supervisors/Confined Space Entry Supervisor.

10. Point of contact is Mr. Jeffrey Hyska, Area II SA Safety Manager at 738-4643/7206 and e-mail address is JeffryM.Hyska@korea.army.mil

Encl  
Appendix A-E



RONALD C. STEPHENS  
COL, SC  
Commander

DISTRIBUTION  
A



## **Appendix A**

### **DEFINITIONS**

**Acceptable Entry Conditions:** The conditions that must exist in a permit-required confined space to allow entry and to ensure that personnel involved with a permit-required confined space entry can safely enter into and work within the spaces.

**Attendant:** A properly trained person stationed outside a permit-required confined space that monitors authorized entrants and performs all attendants duties assigned.

**Authorized Entrant:** A properly trained person authorized by the supervisor to enter and work in a permit-required confined space.

**Blanking/Blinding:** The absolute closure of a pipe, line, or duct by the fastening of a solid plate that completely covers the bore and is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

**Confined Space:** Spaces are enclosures not designed for routine occupancy which an employee may need to enter to perform work. In general, such spaces have poor ventilation, have limited means of entry or egress and contain potential and/or known hazards. Numerous confined spaces are can be found on most Army installations. Examples include storage tanks, pits, boilers, sewers, underground utility vaults, tunnels, and manholes. Personnel entering such spaces may encounter a variety of hazards, including:

- Lack of sufficient oxygen to support life
- Excessive oxygen which increase the danger of fire or explosion
- The presence of flammable or explosive atmosphere or materials
- The presence of toxic toxic atmospheres or materials
- Physical hazards such as
  - (1) Slippery surfaces
  - (2) Conduits
  - (3) Cables, protruding sharp objects or other obstructions to passage
  - (4) Deteriorated or unstable ladders
  - (5) Machinery and electrical devices that require energy isolation (lockout/tagout procedure), etc.

(6) Engulfment, poor illumination often compounds these hazards

**Double Block and Bleed:** The closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

**Emergency:** Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

**Engulfment:** The surrounding and effective capture of a person by a liquid or finely divided solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

**Entry:** The action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

**Entry Permit:** The written or printed document given by the Entry Supervisor to allow and control entry into a permit-required confined space.

**Entry Supervisor:** The person responsible for determining acceptable entry conditions are present at a permit-required confined space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry.

**Hazardous Atmosphere:** An atmosphere that may expose personnel to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL).

(2) Airborne combustible dust as a concentration that meets or exceeds its LFL. (Dust obscures vision at a distance of five feet or less).

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.

(4) Toxic air contaminants in excess of permissible exposure limits or threshold limit value.

(5) Any other atmospheric condition that is immediately dangerous to life or health (IDLH).



**Hot Work Permit:** An employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of proving a source of ignition.

**Immediately Dangerous to Life or Health (IDLH):** Any conditions that pose an immediate or delayed threat to life; which would cause immediate or delayed adverse health effects or that, would interfere with a worker's ability to escape unaided from a permit-required space.

**Inerting:** Displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible

**Isolation:** Positively preventing any unwanted form of energy (or other agent with a serious potential for hazard) from entering the confined space through the use of blanking, double block and bleed, or lockout and (or) tagout.

**Line Breaking:** The intentional opening in a confined space of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, inert gas, or any fluid at volume, pressure or temperature capable of causing injury.

**Non-permit confined space**—A space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazards capable of causing death or serious physical harm.

**Lower Explosive Limit:** Lower Explosive Limit (or lower flammable limit) is minimum the concentration of vapor in air to form an ignitable mixture.

**Non-Permit Confined Space:** A confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

**Oxygen-Deficient Atmosphere:** An atmosphere that contains less than 19.5 percent oxygen by volume.

**Oxygen Enriched Atmosphere:** An atmosphere that contains more than 23.5 percent oxygen by volume.

**Permit-Required Confined Space (Permit Space):** A confined space that has one or more of the following characteristics:

- (1) Contains or has the potential to contain a hazardous atmosphere;
- (2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

**Permit System:** The employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

**Prohibited Condition:** Any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

**Rescue Service:** The personnel designated to rescue employees from permit spaces.

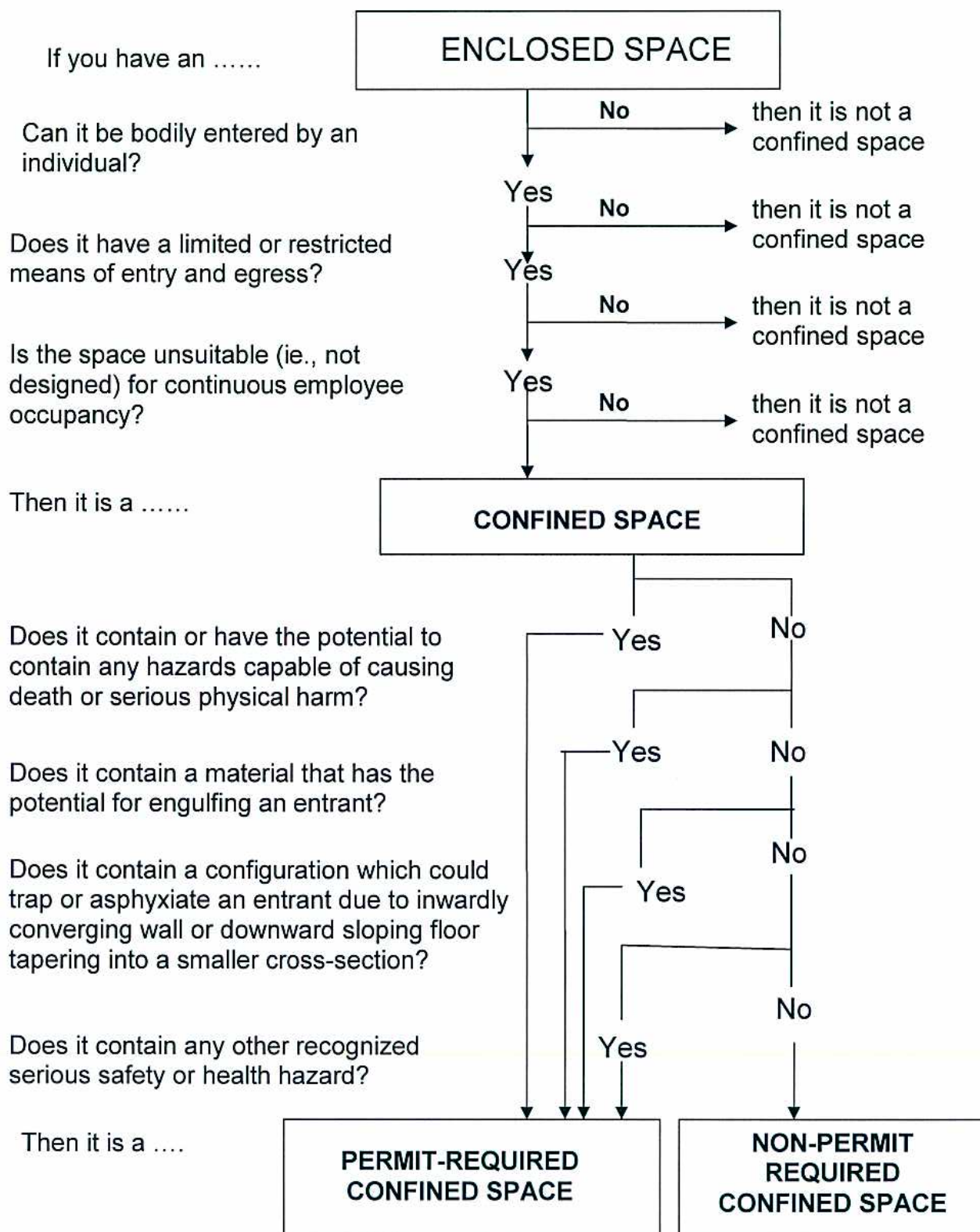
**Retrieval System:** The equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

**Testing:** The process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.



## Appendix B

### PERMIT-REQUIRED CONFINED SPACE DECISION FLOW CHART



Appendix C





## Appendix D

### Confined Space Entry Permit Form

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<b>Date &amp; Time Issued</b>		<b>Date &amp; time Expires</b>	
<b>Space I.D.</b>		<b>Supervisor</b>	
<b>Equipment Affected</b>		<b>Task</b>	
<b>Standby Team Members</b>			
<b>Hot Work Type (circle)</b>	Welding	Cutting	Brazing      Grinding
<b>Confined Space Hazard Assessment (See Appendix E)</b> has been reviewed by Entry Supervisor and Rescue Team Members and is correct.		_____ Entry Supervisor Signature	
Pre-entry brief has been conducted with Entrants, Attendants and Rescue Team Members.		_____ Entry Supervisor Signature	
<b>1. Pre-Entry Atmospheric Checks</b>			
Time (am - pm)			
Oxygen			
Explosive ( % LEL)			
Toxic (PPM)			
Testers Signature			
<b>2. Pre-entry Fluid System Isolation</b>	Yes	No	N/A
Pumps /lines blinded, blocked, disconnected			
<b>3. Ventilation Source Established</b>	Yes	No	N/A
Mechanical Forced Air			
Natural Ventilation			
<b>4. Post Ventilation Pre-Entry Atmospheric Checks</b>			
Time			
Oxygen (%)			
Explosive ( % LEL)			
Toxic (PPM)			
Tester Signature			
<b>5. Communication Procedures</b>			
<div style="display: flex; justify-content: space-around;"> <span>____ Wireless Radio</span> <span>____ Line Radio</span> <span>____ Verbal from Access</span> </div>			



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## 6. Rescue Procedures

\_\_\_\_ Self Rescue      \_\_\_\_ No-entry Rescue      \_\_\_\_ Rescue Team Entry

## 7. Training Verification

The following persons successfully completed required training and training is current for the space to be entered

Position	YES	NO
All persons entering Confined Space		
All persons acting as Supervisor for the Entry		
All persons assigned backup positions		
All persons assigned to monitor access and interior activities		
All persons assigned to emergency rescue team		

## 8. Entry & Rescue Equipment on Scene

Description	Type	YES	NO	NA	Description	Type	YES	NO	NA
Gas Monitor					Life Line				
Safety Harness					Hoisting Equipment				
Fall Arrest Gear					Communication Equipment				
SCBAs					Air Line Respirators				
Protective Clothing					Electrical Gear Rating				
Fire Extinguishers									

## 9. Periodic Atmospheric Checks

Time (am - pm)							
Oxygen							
Explosive ( % LEL)							
Toxic (PPM)							
Testers Signature							

A review of the work authorized by this permit and the information contained on this Entry Permit. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

**Permit Prepared and Completed By:** (Entry On-site Supervisor)

\_\_\_\_\_  
(Print name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Date

**Approved By:** Unit Confined Space Coordinator (Unit CSC)

\_\_\_\_\_  
(Print name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Date



## Appendix E

### Confined Space Hazard Assessment

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Space _____				Date Assessment Last Modified _____															
<b>1. Confined Space</b> - must meet all the below criteria				<b>Permit Required Confined Space</b> must be a confined space and meet any one of the below criteria															
	Is large enough or so configured that an employee can bodily enter and perform work... AND				Contains or has a potential to contain a hazardous atmosphere... OR														
	Has limited or restricted means for entry or exit AND				Contains a material that has the potential for engulfing an entrant... OR														
	Is not designed for continuous employee occupancy.				Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly covering walls or by a floor which slopes downward and tapers to a smaller cross-section... OR														
					Contains any other recognized serious safety or health hazard														
<b>2. Authorized Entry Points</b>																			
	Top			Side			Bottom												
	<b>Hazards</b>	<b>Source/Type</b>		<b>Quantity &amp; Quality (1)</b>	<b>Severity (Rate 1 to 5)</b>	<b>Hazard Abatement Method</b>													
	Explosive Atmosphere			___ LEL(2)															
	Combustible Material																		
	Electrical Circuits																		
	Toxic Gases			___ PEL															
	Toxic Material																		
	Thermal Hazards			___ °F															
	Machinery																		
	Slip / Fall Hazards																		
	Engulfment Hazards																		
	Entrapment Hazards																		
<b>3. Personal Protective Equipment Required</b>																			
	Check <b>Type</b>			Check <b>Type</b>			Check <b>Type</b>												
	Gloves			Hearing Protection			Hard Hat												
	Coveralls			Safety Glasses			Goggles												
	Air Supplied Respirator			Air Purifying Respirator (3)		<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Acid</td> <td style="padding: 2px;">Org</td> <td style="padding: 2px;">DMF</td> <td style="padding: 2px;">N</td> <td style="padding: 2px;">R</td> <td style="padding: 2px;">P</td> </tr> <tr> <td style="height: 15px;"></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Acid	Org	DMF	N	R	P						
Acid	Org	DMF	N	R	P														
	SCBA	Line Fed																	
<b>4. Ventilation Requirements</b>																			
	<b>Space Volume in cubic feet</b>																		
	<b>Natural circulation</b> - no atmospheric hazards in the space - additional ventilation may be required for worker comfort, hot work, grinding or other operations that would produce airborne fumes, mist or dust. Entry Supervisor must assess additional ventilation requirements based on tasks to be performed in the space prior to time of entry																		
	<b>Mechanical ventilation</b> required for venting hazardous atmospheric contaminants																		
	<b>Supply</b>		<b>Exhaust</b>		<b>Local (4)</b>														
	Volume	___ CU/FT per Min	Volume	___ CU/FT per Min	Volume	___ CU/FT per Min													
	Point (5)		Point		Point														



## Confined Space Hazard Assessment

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### 5. Ventilation Formulas & Requirements

**20 Air Changes Per Hour**  
(ACH) required for  
duration of entry  
20 ACH = Space volume X 20

**Adequate Blower  
Capacity (ABC)**  
 $ABC = \frac{\text{Space Volume} \times 20 \text{ ACH}}{60 \text{ Minutes}}$

**Initial Purge Time**  
 $\frac{7.5 \times \text{Space volume}}{\text{Effective Blower Capacity}}$

### 6. Required Rescue & Safety Equipment (check if required)

<input type="checkbox"/>	Life Line	<input type="checkbox"/>	Man Winch
<input type="checkbox"/>	Body Harness	<input type="checkbox"/>	Fall Arrest Unit
<input type="checkbox"/>	Floor level opening barrier	<input type="checkbox"/>	Emergency Retrieval Line
<input type="checkbox"/>	Tripod	<input type="checkbox"/>	Blower
<input type="checkbox"/>	Class I, Division I, Group D Electrical Equipment (6)	<input type="checkbox"/>	Vent Saddle
<input type="checkbox"/>	Powered Communication	<input type="checkbox"/>	Vent Trunks
<input type="checkbox"/>	Portable Lighting	<input type="checkbox"/>	Ladder
<input type="checkbox"/>	Atmospheric Monitor Make & Model	<input type="checkbox"/>	Emergency Escape Respirators

### 7. Acceptable Entry Conditions

<input type="checkbox"/>	Confined Space Entry permit posted	<input type="checkbox"/>	Lockout electrical components in space
<input type="checkbox"/>	Oxygen 19.5 – 23.5%	<input type="checkbox"/>	Lockout mechanical components in space
<input type="checkbox"/>	Lower Explosive Level 10%	<input type="checkbox"/>	Lockout all pipes to and from space
<input type="checkbox"/>	Toxic fumes/vapors less than PEL	<input type="checkbox"/>	Forced Mechanical Ventilation Established & Maintained
<input type="checkbox"/>	No engulfing material in space	<input type="checkbox"/>	No hazardous chemicals or material
<input type="checkbox"/>	Continuous Air Monitoring	<input type="checkbox"/>	Rescue Team Available (7)
<input type="checkbox"/>	Space Drained - Flushed	<input type="checkbox"/>	Pre-entry brief completed
<input type="checkbox"/>	Max Internal temperature _____ °F	<input type="checkbox"/>	Minimum Internal Temperature _____ °F
<input type="checkbox"/>	Training verified for supervisor, entrants and attendants	<input type="checkbox"/>	Training verified current for all Rescue Team Members

### 8. Communication Procedures - between attendant & entrants

\_\_\_\_ Wireless Radio    \_\_\_\_ Line Radios    \_\_\_\_ Verbal from Access

### 9. Rescue Procedures

\_\_\_\_ Self Rescue    \_\_\_\_ Non-entry Rescue    \_\_\_\_ Rescue Team Entry

### 10. Notes



## Confined Space Hazard Assessment

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### 11. Foot Notes

- (1) **Quantity & Quality** - List volume or amount of material. For gases/dust/fumes, list the concentrations.  
For electrical hazards, list voltage
- (2) **LEL** - Lower Explosion Level - lowest % of concentration in which an explosion could occur.
- (3) **Air Purifying Respirator** - select type of filter or cartridge required - Acid Gas, Organic Vapor, (N) Not Oil Resistant, (R) Oil Resistant, (P) Oil Proof, (DMF) Dust- Mist-Fume
- (4) **Local Ventilation** - provide for worker comfort or for drawing away fumes or airborne particles caused by expected work in the space.
- (5) **Point** - list location for entry of supply, local or exhaust ventilation.
- (6) **Class I, Division I, Group D** - refers to hazardous locations that require explosion proof electrical equipment
- (7) **Rescue team** - required to be at access point for entries into spaces with IDLH (immediately dangerous to life and health) atmospheric condition. For all other entries, rescue team must be readily available.

**Reviewed By** Confined Space Operation Personnel

\_\_\_\_\_  
(Print name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Date

And

**Reviewed By** Entry (On-Site) Supervisor

\_\_\_\_\_  
(Print name)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Date